JAPANESE [JP,09-009330,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

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CLAIMS

[Claim(s)]
[Claim 1] The base station generalized by the control station while being arranged at each of two or more wireless zones, respectively, It has two or more mobile stations which communicate between said base stations using a communication channel while moving free in said wireless zone. In the channel change method between wireless zones of the migration communication system which changes said base station and said communication channel, and maintains said communication link even if said mobile station moves in said wireless zone It has a communication channel information information means to report the adjoining zone communication channel information which is the information on said communication channel which each of said base station is using in the adjoining wireless zone. A communication channel information storage means by which each of said mobile station memorizes the information on said adjoining zone communication channel received from said base station from immediately after initiation of said communication link, A communication link quality-detection means to detect the quality of said communication channel from said base station under communication link, A receiving level measurement means for said adjoining zone communication channel to get down, and to measure receiving level if quality degradation of said communication channel is detected, The channel change method between wireless zones of the migration communication system characterized by having a communication channel change means to set said communication channel as the communication channel of the self-wireless zone where the highest receiving level was measured, or said contiguity wireless zone.
[Claim 2] The channel change method between wireless zones of the migration communication system according to claim 1 with which said base station is characterized by always putting said adjoining zone communication channel information on said communication channel under transmission to said mobile station, and transmitting.
[Claim 3] The channel change method between wireless zones of the migration communication system according to claim 1 with which said base station is characterized by putting said adjoining zone communication channel information on said communication channel under transmission to said mobile station intermittently, and transmitting.
[Claim 4] The channel change method between wireless zones of the migration communication system according to claim 1 characterized by assigning said communication channel which is a TDM channel which each of said mobile station performed the group communication link only with the mobile station in the group of the inside which carried out the grouping of said two or more mobile stations to two or more groups, and set to each group of said mobile station beforehand.
[Claim 5] The channel change method between wireless zones of the migration communication system according to claim 1 characterized by the ability of each of said mobile station to communicate only in said limited wireless zone.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention is generalized to a control station — having — two or more wireless zones — respectively — ** — while moving free in the base station and the above-mentioned wireless zone boiled and arranged, even if it has two or more mobile stations which communicate between the above-mentioned base stations using a communication channel and the above-mentioned mobile station moves in the above-mentioned wireless zone, it is related to the channel change method between wireless zones of the migration communication system which changes the above-mentioned base station and the above-mentioned communication channel, and maintains a communication link.
[0002]
[Description of the Prior Art] The mobile station under communication link has measured continuously the receiving level of the control channel which the base station of an adjoining wireless zone transmits, and the receiving level of the communication channel under communication link by the channel change method between wireless zones of this conventional kind of migration communication system, for example, the land mobile radiotelephone method of a cellular communication system, between one of the base stations. If the received electric-field level of the communication channel under communication link falls from a predetermined value, it will judge that this mobile station is distant from the wireless zone which carries out a ** area, and the receiving level of a control channel will change a communication channel to the communication channel of a contiguity wireless zone which fulfills predetermined conditions highly. In this communication channel change, in order to newly assign a communication channel, the base station of a channel change place transmitted and received the control signal in a control channel between mobile stations, started the communication link between the base stations of a change place for the first time after transmission and reception of this control signal, and was terminating the communication link between the base stations before changing to coincidence.
[0003]
[Problem(s) to be Solved by the Invention] By the channel change method between wireless zones of this conventional migration communication system, since the control signal for a channel change was transmitted and received when many mobile stations moved between two or more base stations, the control channel between a base station and a mobile station and between a base station and a control station and the traffic of a cable control line increased, and there was a problem that the load of signal processing in the base station accompanying a communication channel change became large.
[0004]
[Means for Solving the Problem] The channel change method between wireless zones of the migration communication system by this invention The base station generalized by the control station while being arranged at each of two or more wireless zones, respectively, It has two or more mobile stations which communicate between said base stations using a communication channel while moving free in said wireless zone. In the channel change method between wireless

zones of the migration communication system which changes said base station and said communication channel, and maintains said communication link even if said mobile station moves in said wireless zone It has a communication channel information information means to report the adjoining zone communication channel information which is the information on said communication channel which each of said base station is using in the adjoining wireless zone. A communication channel information storage means by which each of said mobile station memorizes the information on said adjoining zone communication channel received from said base station from immediately after initiation of said communication link, A communication link quality-detection means to detect the quality of said communication channel from said base station under communication link, A receiving level measurement means for said adjoining zone communication channel to get down, and to measure receiving level if quality degradation of said communication channel is detected, It has a communication channel change means to set said communication channel as the communication channel of the self-wireless zone where the highest receiving level was measured, or said contiguity wireless zone.

[0005] The 1st embodiment of the channel change method between wireless zones of said migration communication system can take the configuration which said base station always puts on said communication channel while transmitting said adjoining zone communication channel information to said mobile station, and transmits to it.

[0006] The 2nd embodiment of the channel change method between wireless zones of said migration communication system can take the configuration which said base station puts on said communication channel while transmitting said adjoining zone communication channel information to said mobile station intermittently, and transmits to it.

[0007] Each of said mobile station can perform a group communication link only with the mobile station in the group of the inside which carried out the grouping of said two or more mobile stations to two or more groups, and the 3rd embodiment of the channel change method between wireless zones of said migration communication system can take the configuration which is assigning said communication channel which is a TDM channel beforehand set to each group of said mobile station.

[0008] The 4th embodiment of the channel change method between wireless zones of said migration communication system can take the configuration with which each of said mobile station can communicate only in said limited wireless zone.

[0009]

[Example] Next, this invention is explained with reference to a drawing.

[0010] Drawing 1 is the system configuration Fig. of the migration communication system by one example of this invention.

[0011] This migration communication system makes the service area five wireless zones 4-1, 4-2, 4-3, 4-4, and 4-5 plurality and here. A base station 2-1, 2-2, 2-3, 2-4, and 2-5 are arranged the wireless zone 4-1, 4-2, 4-3, 4-4, and 4-5, respectively, by the wire circuit, it connects with a control station 1 and a base station 2-1 thru/or 2-5 are generalized again. while a mobile station 3 moves the wireless zone 4-1 thru/or 4-5 free — a communication channel Tch — using — a base station 2-1 thru/or 2-5 — it communicates between the stations which fulfill inner predetermined conditions. In addition, this migration communication system contains two or more mobile stations which have the same function as a mobile station 3.

[0012] Now, a mobile station 3 is in the point A of the wireless zone 4-2 which exists at the core mostly, and this mobile station 3 is communicating with the base station 2-2 through a communication channel Tch2. In addition, generally a mobile station 3 communicates with still more nearly another base station and mobile station through a base station 2-2 in many cases. Next, if a mobile station 3 moves to the point C in the wireless zone 4-1 through the circumference point B of the wireless zone 4-2, a mobile station 3 will change a communication channel Tch2 to the communication channel Tch1 of a base station 4-1 near point B, and will maintain the communication link with a base station 2 (a base station 2-1 thru/or either of 2-5 are expressed).

[0013] It explains in more detail about the channel change between wireless zones of the migration communication system mentioned above.

[0014] The mobile station 3 and the base station 2-2 under communication link have reported the adjoining zone communication channel information which is the information on the communication channel currently used by the information 4-1 on the communication channel currently used by the adjoining wireless zone 4-1, 4-3, 4-4, and 4-5, i.e., an adjoining base station, 4-3, 4-4, and 4-5 to the mobile station 3 using the communication channel Tch2 under communication link.
[0015] A mobile station 3 memorizes the adjoining zone communication channel information received from the base station 2-2 in the communication channel information storage section from immediately after communicative initiation. The mobile station 3 has detected continuously in the communication link quality-detection section again, the quality, for example, the receiving level, of the communication channel Tch2 which a base station 2-2 transmits. If a mobile station 3 moves to Point B and the above-mentioned communication link quality-detection section detects quality degradation of a communication channel Tch2, all the communication channels Tch1, Tch3, Tch4, and Tch5 currently used by the base station 2-1 of the already memorized contiguity wireless zone, 2-3, 2-4, and 2-5 will get down, and the receiving level test section which a mobile station 3 contains will measure receiving level. Since a mobile station 3 measures most highly the receiving level of the communication channel Tch1 currently used in the base station 4-1 at Point B, a mobile station 3 changes a communication channel Tch2 to the communication channel Tch1 of a base station 4-1 by the communication channel change section. Then, although a mobile station 3 moves to the point C in the wireless zone 4-1, the communication channel Tch1 after a change is maintained, and the communication link between base stations 2-1 is continued.
[0016] Drawing 2 is a signal block diagram of a communication channel Tch sent to a mobile station 3 from the base station 2 of this example, and shows the example of 2 signal configurations of (a) and (b). Moreover, drawing 3 is the signal block diagram of the adjoining zone communication channel information included in a communication channel Tch. The communication channel Tch shown here is one slot of a TDM method. In addition, the channel Tch for a communication link needs to be identified in the combination of either of two or more radio channels (frequency channel), and either of two or more TDM slots.
[0017] When drawing 2 (a) is referred to, this communication channel Tch is a TDM channel containing the radio control channel (RCCH) which transmits the overhead of this communication channel, the communication channel information channel (CCTCH) which transmits adjoining zone communication channel information, the information channel (TCH) which transmits communication link information, and the low-speed accompanying control channel (SACCH) which transmits the information for control incidental to the above-mentioned information channel. If this communication channel Tch is used, a base station 2 can transmit adjoining zone communication channel information for every transmission of a communication channel Tch. In addition, in an information channel, a sound signal, a data signal, a message control signal, etc. are transmitted, and a low-speed accompanying control channel transmits the signal which shows the classification of an information channel.
[0018] When drawing 2 (b) is referred to, this communication channel Tch is a TDM channel containing the radio control channel (RCCH) which transmits the overhead of this communication channel, the information channel (TCH) which transmits communication link information, and the low-speed accompanying control channel (SACCH) which transmits the information for control along with the above-mentioned information channel. In an information channel (TCH), a sound signal, a data signal, a message control signal, adjoining zone communication channel information, etc. are transmitted, and a low-speed accompanying control channel transmits the signal which shows the classification of an information channel. When using this communication channel Tch, adjoining zone communication channel information can be intermittently put on an information channel TCH, and a base station 2 can transmit it to it.
[0019] If drawing 3 is referred to, the adjoining zone communication channel information put and transmitted to the communication channel information channel (CCTCH) of drawing 2 (a) or the information channel (TCH) of drawing 2 (b) will consist of several n of the wireless zone (contiguity wireless zone) contiguous to the wireless zone of the corresponding base station 2, a

sign of a contiguity wireless zone, and communication channel information corresponding to each of a contiguity wireless zone. Communication channel information consists of a wireless channel number, a frequency number with the same semantics, and the slot number of a TDM channel. In addition, the communication channel Tch which can use a base station 2 is a multiple channel general [by the combination of a frequency number and the slot number].
[0020] When drawing 1 and drawing 3 are combined and referred to and a mobile station 3 is in Point A, the mobile station 3 got down from the base station 2-2, and has received the communication channel Tch2. The contiguity wireless zones of a base station 2-2 are the wireless zone 2-1, 2-3, 2-4, and 2-5. Therefore, a base station 2-2 puts the adjoining zone communication channel information which consists of the frequency number and the slot number corresponding to the sign of four contiguity wireless zones, a base station 2-1, 2-3, 2-4, and 2-5, and the communication channel, Tch1, Tch3, Tch4, and Tch5, Tch currently used in these base stations on a communication channel Tch2, and is transmitted, respectively. [for example,]

[0021] Drawing 4 is the block diagram of a base station 2 used for this example.
[0022] The base station 2 is equipped with a control device 21, the memory 22 which memorizes the information on the communication channel Tch in use (adjoining zone communication channel information, i.e., a frequency number, and slot number) etc. in ID of a local station, the sign of a contiguity wireless zone, and the contiguity wireless zone, the hopping synthesizer 23 which can change a frequency for every slot, the transmitter 24, the receiver 25, the antenna common machine 26, and the antenna 27. In addition, adjoining zone communication channel information is collected from a contiguity wireless zone through a control station 1. Moreover, a frequency number and the slot number in use are also memorized by memory 22 by the local station as a communication channel Tch. If the following TDM slot is a communication channel, from the information on memory 22, a control device 21 will specify a frequency number as hopping SHISESAIZA 23, and will direct to send out the communication channel Tch which included ID of a local station, and adjoining zone communication channel information to the transmitter 24.
[0023] Drawing 5 is the block diagram of the mobile station 3 used for this example.
[0024] The memory 32 in which a mobile station 3 remembers the adjoining zone communication channel information that it received from the base station 2 to be a control device 31 from immediately after communicative initiation, The synthesizer 33 into which a frequency is changed for every communication channel Tch received with directions of a control device 31, It has the quality measuring device 38 which measures the receiving level of a communication channel in use in receiving quality and contiguity wireless zones, such as receiving level of a transmitter 34, a receiver 35, the antenna common machine 36, an antenna 37, and the communication channel Tch received from a base station 2, and a signal error rate.
[0025] Drawing 6 is a flow chart which shows actuation of the mobile station 3 of this example.
[0026] If drawing 1 , drawing 5 , and drawing 6 are combined and referred to, a mobile station 3 will start a communication link at the point A in the wireless zone 4-1 using a base station 2-2 and a communication channel Tch2. A mobile station 3 gets down and receives a communication channel Tch in a control unit 31 through an antenna 37, the antenna common machine 36, and a receiver 35. Memory 32 is memorized in response to the adjoining zone communication channel information which gets down and is transmitted by the communication channel Tch2 from immediately after communication link initiation from the control unit 31 (step 1). When a mobile station 3 is in the wireless zone 4-2, after a communication link is completed (y of step 2), a control unit 31 terminates the communication link with a base station 2-2 (step 3).
[0027] The quality measuring device 38 got down during communicative continuation (n of step 2), and the receiving level of a communication channel Tch2 is measured continuously (step 4). If this receiving level is more than predetermined level (n of step 5), a mobile station 3 will repeat the actuation from step 2, and a control device 31 will make the communication link which used the base station 2-2 and the communication channel Tch continue. Here, if a mobile station 3 moves to the point B in the edge of the wireless zone 4-2 of wireless zone 4-1 approach, the quality measuring device 38 will get down, receiving level degradation of a communication channel Tch2 will be detected, and a control unit 31 will be told (y of step 5).

[0028] When the detection report of receiving level degradation of the communication channel Tch2 under communication link is received, all the communication channels Tch1, Tch3, Tch4, and Tch5 currently used by the base station 2-1 of the contiguity wireless zone memorized in memory 32, 2-3, 2-4, and 2-5 get down, and a control unit 31 makes the quality measuring device 38 measure receiving level (n of step 6 and step 7). After getting down from the base station of all contiguity wireless zones and completing receiving level measurement of a communication channel (y of step 7), the frequency of a synthesizer 33 is controlled, it gets down from the base station 2-2 of a self-wireless zone, and the base station of a contiguity wireless zone, and, as for a control device 31, the communication channel Tch of a receiver 35 is set as the communication channel with the highest receiving level of the communication channels Tch1-Tch5. Since the quality measuring device 38 measures most highly the receiving level of the communication channel Tch1 currently used in the base station 4-1 at Point B, a control device 31 changes the communication channel Tch2 which had received the receiver 35 to the communication channel Tch1 of a base station 4-1 (step 8). Then, a mobile station 3 maintains the communication channel Tch1 after changing the communication link between return and a base station 2-1 to actuation of step 2, and continues. This condition continues, even if a mobile station 3 moves to the point C in the wireless zone 4-1.

[0029] As mentioned above, the channel change method between wireless zones of the migration communication system by this invention explained using the example is effective in especially the migration communication system for a group communication link represented by public business use digital migration communication system and the MCA system. In a group communication link, the grouping of the mobile station in a service area is carried out to two or more groups, and a mobile station performs an one-pair N communication link with the mobile station N station in a group. In such a group communication link, each of a base station 2 defines a communication channel Tch beforehand for every group of a mobile station, and enables it to communicate without an intermission in it using this communication channel Tch in many cases. Thus, if the communication channel which each mobile station group uses is defined beforehand, the burden of the communication channel channel selection in a mobile station 3 will become light.

[0030] In addition, as for the channel change method between wireless zones of the migration communication system by this invention, it is needless to say that the range of the wireless zone 4 where a mobile station 3 can communicate like a certain MCA system may be limited from the former. In this case, the function which limits the distant office which can communicate to a base station 2 or a mobile station 3 is prepared.

[0031]

[Effect of the Invention] This invention is equipped with a communication channel information information means to report the adjoining zone communication channel information which is the information on said communication channel currently used in the wireless zone where each of two or more base stations adjoins as explained above. A communication channel information storage means by which each of two or more mobile stations memorizes the information on said adjoining zone communication channel received from said base station from immediately after initiation of said communication link, A communication link quality-detection means to detect the quality of said communication channel from said base station under communication link, A receiving level measurement means for said adjoining zone communication channel to get down, and to measure receiving level if quality degradation of said communication channel is detected, Since it has a communication channel change means to set said communication channel as the communication channel of the self-wireless zone where the highest receiving level was measured, or said contiguity wireless zone While said mobile station can perform the change of a communication channel independently and can mitigate the traffic of wireless and a cable control line at the time of a channel change, without needing no transmission and reception of the control signal for a channel change, it is effective in unloading of signal processing in a base station being made.

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TECHNICAL FIELD

[Industrial Application] this invention is generalized to a control station — having — two or more wireless zones — respectively — ** — while moving free in the base station and the above-mentioned wireless zone boiled and arranged, even if it has two or more mobile stations which communicate between the above-mentioned base stations using a communication channel and the above-mentioned mobile station moves in the above-mentioned wireless zone, it is related to the channel change method between wireless zones of the migration communication system which changes the above-mentioned base station and the above-mentioned communication channel, and maintains a communication link.

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PRIOR ART

[Description of the Prior Art] The mobile station under communication link has measured continuously the receiving level of the control channel which the base station of an adjoining wireless zone transmits, and the receiving level of the communication channel under communication link by the channel change method between wireless zones of this conventional kind of migration communication system, for example, the land mobile radiotelephone method of a cellular communication system, between one of the base stations. If the received electric-field level of the communication channel under communication link falls from a predetermined value, it will judge that this mobile station is distant from the wireless zone which carries out a ** area, and the receiving level of a control channel will change a communication channel to the communication channel of a contiguity wireless zone which fulfills predetermined conditions highly. In this communication channel change, in order to newly assign a communication channel, the base station of a channel change place transmitted and received the control signal in a control channel between mobile stations, started the communication link between the base stations of a change place for the first time after transmission and reception of this control signal, and was terminating the communication link between the base stations before changing to coincidence.

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EFFECT OF THE INVENTION

[Effect of the Invention] This invention is equipped with a communication channel information information means to report the adjoining zone communication channel information which is the information on said communication channel currently used in the wireless zone where each of two or more base stations adjoins as explained above. A communication channel information storage means by which each of two or more mobile stations memorizes the information on said adjoining zone communication channel received from said base station from immediately after initiation of said communication link, A communication link quality-detection means to detect the quality of said communication channel from said base station under communication link, A receiving level measurement means for said adjoining zone communication channel to get down, and to measure receiving level if quality degradation of said communication channel is detected, Since it has a communication channel change means to set said communication channel as the communication channel of the self-wireless zone where the highest receiving level was measured, or said contiguity wireless zone While said mobile station can perform the change of a communication channel independently and can mitigate the traffic of wireless and a cable control line at the time of a channel change, without needing no transmission and reception of the control signal for a channel change, it is effective in unloading of signal processing in a base station being made.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the channel change method between wireless zones of this conventional migration communication system, since the control signal for a channel change was transmitted and received when many mobile stations moved between two or more base stations, the control channel between a base station and a mobile station and between a base station and a control station and the traffic of a cable control line increased, and there was a problem that the load of signal processing in the base station accompanying a communication channel change became large.

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MEANS

[Means for Solving the Problem] The channel change method between wireless zones of the migration communication system by this invention The base station generalized by the control station while being arranged at each of two or more wireless zones, respectively, It has two or more mobile stations which communicate between said base stations using a communication channel while moving free in said wireless zone. In the channel change method between wireless zones of the migration communication system which changes said base station and said communication channel, and maintains said communication link even if said mobile station moves in said wireless zone It has a communication channel information information means to report the adjoining zone communication channel information which is the information on said communication channel which each of said base station is using in the adjoining wireless zone. A communication channel information storage means by which each of said mobile station memorizes the information on said adjoining zone communication channel received from said base station from immediately after initiation of said communication link, A communication link quality-detection means to detect the quality of said communication channel from said base station under communication link, A receiving level measurement means for said adjoining zone communication channel to get down, and to measure receiving level if quality degradation of said communication channel is detected, It has a communication channel change means to set said communication channel as the communication channel of the self-wireless zone where the highest receiving level was measured, or said contiguity wireless zone.
[0005] The 1st embodiment of the channel change method between wireless zones of said migration communication system can take the configuration which said base station always puts on said communication channel while transmitting said adjoining zone communication channel information to said mobile station, and transmits to it.
[0006] The 2nd embodiment of the channel change method between wireless zones of said migration communication system can take the configuration which said base station puts on said communication channel while transmitting said adjoining zone communication channel information to said mobile station intermittently, and transmits to it.
[0007] Each of said mobile station can perform a group communication link only with the mobile station in the group of the inside which carried out the grouping of said two or more mobile stations to two or more groups, and the 3rd embodiment of the channel change method between wireless zones of said migration communication system can take the configuration which is assigning said communication channel which is a TDM channel beforehand set to each group of said mobile station.
[0008] The 4th embodiment of the channel change method between wireless zones of said migration communication system can take the configuration with which each of said mobile station can communicate only in said limited wireless zone.

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EXAMPLE

[Example] Next, this invention is explained with reference to a drawing.
[0010] Drawing 1 is the system configuration Fig. of the migration communication system by one example of this invention.
[0011] This migration communication system makes the service area five wireless zones 4-1, 4-2, 4-3, 4-4, and 4-5 plurality and here. A base station 2-1, 2-2, 2-3, 2-4, and 2-5 are arranged the wireless zone 4-1, 4-2, 4-3, 4-4, and 4-5, respectively, by the wire circuit, it connects with a control station 1 and a base station 2-1 thru/or 2-5 are generalized again. while a mobile station 3 moves the wireless zone 4-1 thru/or 4-5 free — a communication channel Tch — using — a base station 2-1 thru/or 2-5 — it communicates between the stations which fulfill inner predetermined conditions. In addition, this migration communication system contains two or more mobile stations which have the same function as a mobile station 3.
[0012] Now, a mobile station 3 is in the point A of the wireless zone 4-2 which exists at the core mostly, and this mobile station 3 is communicating with the base station 2-2 through a communication channel Tch2. In addition, generally a mobile station 3 communicates with still more nearly another base station and mobile station through a base station 2-2 in many cases. Next, if a mobile station 3 moves to the point C in the wireless zone 4-1 through the circumference point B of the wireless zone 4-2, a mobile station 3 will change a communication channel Tch2 to the communication channel Tch1 of a base station 4-1 near point B, and will maintain the communication link with a base station 2 (a base station 2-1 thru/or either of 2-5 are expressed).
[0013] It explains in more detail about the channel change between wireless zones of the migration communication system mentioned above.
[0014] The mobile station 3 and the base station 2-2 under communication link have reported the adjoining zone communication channel information which is the information on the communication channel currently used by the information 4-1 on the communication channel currently used by the adjoining wireless zone 4-1, 4-3, 4-4, and 4-5, i.e., an adjoining base station, 4-3, 4-4, and 4-5 to the mobile station 3 using the communication channel Tch2 under communication link.
[0015] A mobile station 3 memorizes the adjoining zone communication channel information received from the base station 2-2 in the communication channel information storage section from immediately after communicative initiation. The mobile station 3 has detected continuously in the communication link quality-detection section again, the quality, for example, the receiving level, of the communication channel Tch2 which a base station 2-2 transmits. If a mobile station 3 moves to Point B and the above-mentioned communication link quality-detection section detects quality degradation of a communication channel Tch2, all the communication channels Tch1, Tch3, Tch4, and Tch5 currently used by the base station 2-1 of the already memorized contiguity wireless zone, 2-3, 2-4, and 2-5 will get down, and the receiving level test section which a mobile station 3 contains will measure receiving level. Since a mobile station 3 measures most highly the receiving level of the communication channel Tch1 currently used in the base station 4-1 at Point B, a mobile station 3 changes a communication channel Tch2 to the communication channel Tch1 of a base station 4-1 by the communication channel change

section. Then, although a mobile station 3 moves to the point C in the wireless zone 4-1, the communication channel Tch1 after a change is maintained, and the communication link between base stations 2-1 is continued.
[0016] Drawing 2 is a signal block diagram of a communication channel Tch sent to a mobile station 3 from the base station 2 of this example, and shows the example of 2 signal configurations of (a) and (b). Moreover, drawing 3 is the signal block diagram of the adjoining zone communication channel information included in a communication channel Tch. The communication channel Tch shown here is one slot of a TDM method. In addition, the channel Tch for a communication link needs to be identified in the combination of either of two or more radio channels (frequency channel), and either of two or more TDM slots.
[0017] When drawing 2 (a) is referred to, this communication channel Tch is a TDM channel containing the radio control channel (RCCH) which transmits the overhead of this communication channel, the communication channel information channel (CCTCH) which transmits adjoining zone communication channel information, the information channel (TCH) which transmits communication link information, and the low-speed accompanying control channel (SACCH) which transmits the information for control incidental to the above-mentioned information channel. If this communication channel Tch is used, a base station 2 can transmit adjoining zone communication channel information for every transmission of a communication channel Tch. In addition, in an information channel, a sound signal, a data signal, a message control signal, etc. are transmitted, and a low-speed accompanying control channel transmits the signal which shows the classification of an information channel.
[0018] When drawing 2 (b) is referred to, this communication channel Tch is a TDM channel containing the radio control channel (RCCH) which transmits the overhead of this communication channel, the information channel (TCH) which transmits communication link information, and the low-speed accompanying control channel (SACCH) which transmits the information for control along with the above-mentioned information channel. In an information channel (TCH), a sound signal, a data signal, a message control signal, adjoining zone communication channel information, etc. are transmitted, and a low-speed accompanying control channel transmits the signal which shows the classification of an information channel. When using this communication channel Tch, adjoining zone communication channel information can be intermittently put on an information channel TCH, and a base station 2 can transmit it to it.
[0019] If drawing 3 is referred to, the adjoining zone communication channel information put and transmitted to the communication channel information channel (CCTCH) of drawing 2 (a) or the information channel (TCH) of drawing 2 (b) will consist of several n of the wireless zone (contiguity wireless zone) contiguous to the wireless zone of the corresponding base station 2, a sign of a contiguity wireless zone, and communication channel information corresponding to each of a contiguity wireless zone. Communication channel information consists of a wireless channel number, a frequency number with the same semantics, and the slot number of a TDM channel. In addition, the communication channel Tch which can use a base station 2 is a multiple channel general [by the combination of a frequency number and the slot number].
[0020] When drawing 1 and drawing 3 are combined and referred to and a mobile station 3 is in Point A, the mobile station 3 got down from the base station 2-2, and has received the communication channel Tch2. The contiguity wireless zones of a base station 2-2 are the wireless zone 2-1, 2-3, 2-4, and 2-5. Therefore, a base station 2-2 puts the adjoining zone communication channel information which consists of the frequency number and the slot number corresponding to the sign of four contiguity wireless zones, a base station 2-1, 2-3, 2-4, and 2-5, and the communication channel, Tch1, Tch3, Tch4, and Tch5, Tch currently used in these base stations on a communication channel Tch2, and is transmitted, respectively. [for example,]

[0021] Drawing 4 is the block diagram of a base station 2 used for this example.
[0022] The base station 2 is equipped with a control device 21, the memory 22 which memorizes the information on the communication channel Tch in use (adjoining zone communication channel information, i.e., a frequency number, and slot number) etc. in ID of a local station, the sign of a contiguity wireless zone, and the contiguity wireless zone, the hopping synthesizer 23 which can

change a frequency for every slot, the transmitter 24, the receiver 25, the antenna common machine 26, and the antenna 27. In addition, adjoining zone communication channel information is collected from a contiguity wireless zone through a control station 1. Moreover, a frequency number and the slot number in use are also memorized by memory 22 by the local station as a communication channel Tch. If the following TDM slot is a communication channel, from the information on memory 22, a control device 21 will specify a frequency number as hopping SHISESAIZA 23, and will direct to send out the communication channel Tch which included ID of a local station, and adjoining zone communication channel information to the transmitter 24.
[0023] Drawing 5 is the block diagram of the mobile station 3 used for this example.
[0024] The memory 32 in which a mobile station 3 remembers the adjoining zone communication channel information that it received from the base station 2 to be a control device 31 from immediately after communicative initiation, The synthesizer 33 into which a frequency is changed for every communication channel Tch received with directions of a control device 31, It has the quality measuring device 38 which measures the receiving level of a communication channel in use in receiving quality and contiguity wireless zones, such as receiving level of a transmitter 34, a receiver 35, the antenna common machine 36, an antenna 37, and the communication channel Tch received from a base station 2, and a signal error rate.
[0025] Drawing 6 is a flow chart which shows actuation of the mobile station 3 of this example.
[0026] If drawing 1 , drawing 5 , and drawing 6 are combined and referred to, a mobile station 3 will start a communication link at the point A in the wireless zone 4-1 using a base station 2-2 and a communication channel Tch2. A mobile station 3 gets down and receives a communication channel Tch in a control unit 31 through an antenna 37, the antenna common machine 36, and a receiver 35. Memory 32 is memorized in response to the adjoining zone communication channel information which gets down and is transmitted by the communication channel Tch2 from immediately after communication link initiation from the control unit 31 (step 1). When a mobile station 3 is in the wireless zone 4-2, after a communication link is completed (y of step 2), a control unit 31 terminates the communication link with a base station 2-2 (step 3).
[0027] The quality measuring device 38 got down during communicative continuation (n of step 2), and the receiving level of a communication channel Tch2 is measured continuously (step 4). If this receiving level is more than predetermined level (n of step 5), a mobile station 3 will repeat the actuation from step 2, and a control device 31 will make the communication link which used the base station 2-2 and the communication channel Tch continue. Here, if a mobile station 3 moves to the point B in the edge of the wireless zone 4-2 of wireless zone 4-1 approach, the quality measuring device 38 will get down, receiving level degradation of a communication channel Tch2 will be detected, and a control unit 31 will be told (y of step 5).
[0028] When the detection report of receiving level degradation of the communication channel Tch2 under communication link is received, all the communication channels Tch1, Tch3, Tch4, and Tch5 currently used by the base station 2-1 of the contiguity wireless zone memorized in memory 32, 2-3, 2-4, and 2-5 get down, and a control unit 31 makes the quality measuring device 38 measure receiving level (n of step 6 and step 7). After getting down from the base station of all contiguity wireless zones and completing receiving level measurement of a communication channel (y of step 7), the frequency of a synthesizer 33 is controlled, it gets down from the base station 2-2 of a self-wireless zone, and the base station of a contiguity wireless zone, and, as for a control device 31, the communication channel Tch of a receiver 35 is set as the communication channel with the highest receiving level of the communication channels Tch1-Tch5. Since the quality measuring device 38 measures most highly the receiving level of the communication channel Tch1 currently used in the base station 4-1 at Point B, a control device 31 changes the communication channel Tch2 which had received the receiver 35 to the communication channel Tch1 of a base station 4-1 (step 8). Then, a mobile station 3 maintains the communication channel Tch1 after changing the communication link between return and a base station 2-1 to actuation of step 2, and continues. This condition continues, even if a mobile station 3 moves to the point C in the wireless zone 4-1.
[0029] As mentioned above, the channel change method between wireless zones of the migration communication system by this invention explained using the example is effective in especially

the migration communication system for a group communication link represented by public business use digital migration communication system and the MCA system. In a group communication link, the grouping of the mobile station in a service area is carried out to two or more groups, and a mobile station performs an one-pair N communication link with the mobile station N station in a group. In such a group communication link, each of a base station 2 defines a communication channel Tch beforehand for every group of a mobile station, and enables it to communicate without an intermission in it using this communication channel Tch in many cases. Thus, if the communication channel which each mobile station group uses is defined beforehand, the burden of the communication channel channel selection in a mobile station 3 will become light.

[0030] In addition, as for the channel change method between wireless zones of the migration communication system by this invention, it is needless to say that the range of the wireless zone 4 where a mobile station 3 can communicate like a certain MCA system may be limited from the former. In this case, the function which limits the distant office which can communicate to a base station 2 or a mobile station 3 is prepared.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the system configuration Fig. of one example of this invention.
[Drawing 2] It is the signal block diagram of a communication channel Tch sent to a mobile station 3 from the base station 2 of this example, and (a) shows the 1st example and (b) shows the 2nd example.
[Drawing 3] It is the signal block diagram of the adjoining zone communication channel information included in a communication channel Tch.
[Drawing 4] It is the block diagram of a base station 2 used for this example.
[Drawing 5] It is the block diagram of the mobile station 3 used for this example.
[Drawing 6] It is the flow chart which shows actuation of the mobile station 3 of this example.
[Description of Notations]
1 Control Station
2-1 to 2-5 Base station
3 Mobile Station
4-1 to 4-5 Wireless zone
21 Control Unit
22 Memory
23 Hopping Synthesizer
24 Transmitter
25 Receiver
26 Antenna Common Machine
27 Antenna
31 Control Unit
32 Memory
33 Synthesizer
34 Transmitter
35 Receiver
36 Antenna Common Machine
37 Antenna
38 Quality Measuring Device

[Translation done.]

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(71)出願人　390000974
日本電気移動通信株式会社
横浜市港北区新横浜三丁目16番８号　（ＮＥＣ移動通信ビル）

(72)発明者　佐藤　真弓
神奈川県横浜市港北区新横浜三丁目16番８号　日本電気移動通信株式会社内

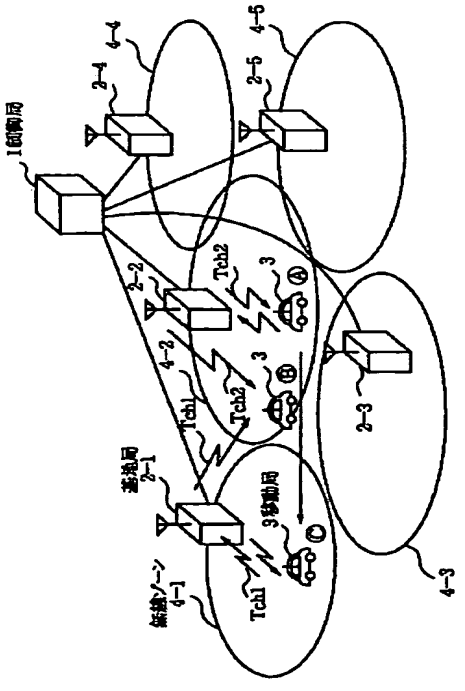
(74)代理人　弁理士　京本　直樹　（外２名）

(54)【発明の名称】　移動通信システムの無線ゾーン間チャネル切替方式

(57)【要約】

【目的】ゾーン間チャネル切替時における制御回線のトラヒック減少および基地局における信号処理の負担軽減を図る。

【構成】無線ゾーン４－１に属する基地局２－２は移動局３に隣接無線ゾーンの使用している通信チャネル情報をＴＤＭスロットの通信チャネル情報チャネルで伝送する。移動局３はこのチャネル情報を記憶しておく。移動局３が地点Ａから地点Ｂに移動して基地局２－２からの下り通信チャネルＴｃｈ２の受信レベルが低下すると、移動局３は隣接無線ゾーンの下り通信チャネルの受信レベルを測定する。この測定結果を受けて、移動局３は通信チャネルを最も高い受信レベルを示す基地局２－１の通信チャネルＴｃｈ１に切り替える。



【特許請求の範囲】
【請求項１】　複数の無線ゾーンの各各にそれぞれ配置されるとともに制御局に統括される基地局と、前記無線ゾーンを自在に移動するとともに通信チャネルを用いて前記基地局との間で通信する複数の移動局とを備え、前記移動局が前記無線ゾーンを移動しても前記基地局および前記通信チャネルを切り替えて前記通信を維持する移動通信システムの無線ゾーン間チャネル切替方式において、
前記基地局の各各が、隣接する無線ゾーンで使用している前記通信チャネルの情報である隣接ゾーン通信チャネル情報を報知する通信チャネル情報報知手段を備え、
前記移動局の各各が、前記基地局から受けた前記隣接ゾーン通信チャネルの情報を前記通信の開始直後から記憶する通信チャネル情報記憶手段と、通信中の前記基地局からの前記通信チャネルの品質を検出する通信品質検出手段と、前記通信チャネルの品質劣化が検出されると前記隣接ゾーン通信チャネルの下り受信レベルを測定する受信レベル測定手段と、前記通信チャネルを最も高い受信レベルが測定された自無線ゾーンまたは前記隣接無線ゾーンの通信チャネルに設定する通信チャネル切替手段とを備えることを特徴とする移動通信システムの無線ゾーン間チャネル切替方式。
【請求項２】　前記基地局が、前記隣接ゾーン通信チャネル情報を前記移動局に送信中の前記通信チャネルに常に乗せて送信することを特徴とする請求項１記載の移動通信システムの無線ゾーン間チャネル切替方式。
【請求項３】　前記基地局が、前記隣接ゾーン通信チャネル情報を前記移動局に送信中の前記通信チャネルに間欠的に乗せて送信することを特徴とする請求項１記載の移動通信システムの無線ゾーン間チャネル切替方式。
【請求項４】　前記移動局の各各が、複数の前記移動局を複数群にグルーピングしたうちの群内の移動局とのみグループ通信を行い、
前記移動局の各群には、予め定めたＴＤＭチャネルである前記通信チャネルが割当てられていることを特徴とする請求項１記載の移動通信システムの無線ゾーン間チャネル切替方式。
【請求項５】　前記移動局の各各が、限定された前記無線ゾーンでのみ通信できることを特徴とする請求項１記載の移動通信システムの無線ゾーン間チャネル切替方式。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は制御局に統括され複数の無線ゾーンの各各ごとに配置される基地局と上記無線ゾーンを自在に移動するとともに通信チャネルを用いて上記基地局との間で通信する複数の移動局とを備え、上記移動局が上記無線ゾーンを移動しても上記基地局および上記通信チャネルを切り替えて通信を維持する移動通信システムの無線ゾーン間チャネル切替方式に関する。
【０００２】
【従来の技術】従来のこの種の移動通信システムの無線ゾーン間チャネル切替方式，例えばセルラー方式の自動車電話方式等では、基地局の一つとの間で通信中の移動局は、隣接する無線ゾーンの基地局が送信する制御チャネルの受信レベルおよび通信中の通信チャネルの受信レベルを絶えず測定している。通信中の通信チャネルの受信電界レベルが所定値より低下すると、この移動局は、在圏する無線ゾーンから離れつつあると判断し、通信チャネルを制御チャネルの受信レベルが高く，また所定の条件を満たす隣接無線ゾーンの通信チャネルに切り替える。この通信チャネル切替においては、チャネル切替先の基地局は新たに通信チャネルを割り当てるために、移動局との間で制御チャネルでの制御信号の送受信を行い、この制御信号の送受信の後にはじめて切替先の基地局との間で通信を開始し、同時に切替前の基地局との間の通信を終了させていた。
【０００３】
【発明が解決しようとする課題】この従来の移動通信システムの無線ゾーン間チャネル切替方式では、多数の移動局が複数の基地局間を移動する際に、チャネル切替用制御信号の送受信を行うので、基地局と移動局との間および基地局と制御局との間における制御チャネルおよび有線制御回線のトラヒックが増大し、また通信チャネル切替に伴なう基地局での信号処理の負荷が大きくなるという問題があった。
【０００４】
【課題を解決するための手段】本発明による移動通信システムの無線ゾーン間チャネル切替方式は、複数の無線ゾーンの各各にそれぞれ配置されるとともに制御局に統括される基地局と、前記無線ゾーンを自在に移動するとともに通信チャネルを用いて前記基地局との間で通信する複数の移動局とを備え、前記移動局が前記無線ゾーンを移動しても前記基地局および前記通信チャネルを切り替えて前記通信を維持する移動通信システムの無線ゾーン間チャネル切替方式において、前記基地局の各各が、隣接する無線ゾーンで使用している前記通信チャネルの情報である隣接ゾーン通信チャネル情報を報知する通信チャネル情報報知手段を備え、前記移動局の各各が、前記基地局から受けた前記隣接ゾーン通信チャネルの情報を前記通信の開始直後から記憶する通信チャネル情報記憶手段と、通信中の前記基地局からの前記通信チャネルの品質を検出する通信品質検出手段と、前記通信チャネルの品質劣化が検出されると前記隣接ゾーン通信チャネルの下り受信レベルを測定する受信レベル測定手段と、前記通信チャネルを最も高い受信レベルが測定された自無線ゾーンまたは前記隣接無線ゾーンの通信チャネルに設定する通信チャネル切替手段とを備える。
【０００５】前記移動通信システムの無線ゾーン間チャ

ネル切替方式の第１の実施態様は、前記基地局が、前記隣接ゾーン通信チャネル情報を前記移動局に送信中の前記通信チャネルに常に乗せて送信する構成をとることができる。

【０００６】前記移動通信システムの無線ゾーン間チャネル切替方式の第２の実施態様は、前記基地局が、前記隣接ゾーン通信チャネル情報を前記移動局に送信中の前記通信チャネルに間欠的に乗せて送信する構成をとることができる。

【０００７】前記移動通信システムの無線ゾーン間チャネル切替方式の第３の実施態様は、前記移動局の各各が、複数の前記移動局を複数群にグルーピングしたうちの群内の移動局とのみグループ通信を行い、前記移動局の各群には、予め定めたＴＤＭチャネルである前記通信チャネルを割当てている構成をとることができる。

【０００８】前記移動通信システムの無線ゾーン間チャネル切替方式の第４の実施態様は、前記移動局の各各が、限定された前記無線ゾーンでのみ通信できる構成をとることができる。

【０００９】

【実施例】次に、本発明について図面を参照して説明する。

【００１０】図１は本発明の一実施例による移動通信システムのシステム構成図である。

【００１１】この移動通信システムは複数，ここでは５つの無線ゾーン４－１，４－２，４－３，４－４および４－５をサービスエリアとしている。無線ゾーン４－１，４－２，４－３，４－４および４－５には基地局２－１，２－２，２－３，２－４および２－５がそれぞれ配置され、基地局２－１ないし２－５は有線回線で制御局１に接続されまた統括されている。移動局３は無線ゾーン４－１ないし４－５を自在に移動するとともに通信チャネルＴｃｈを用いて基地局２－１ないし２－５うちの所定の条件を満たす局との間で通信する。なお、この移動通信システムは移動局３と同じ機能を有する複数の移動局を含んでいる。

【００１２】いま、移動局３が無線ゾーン４－２のほぼ中心にある地点Ａにあり、この移動局３は通信チャネルＴｃｈ２を通じて基地局２－２と通信している。なお一般には、移動局３は基地局２－２を介してさらに別の基地局および移動局と通信することが多い。次に、移動局３が無線ゾーン４－２の周辺地点Ｂを経て無線ゾーン４－１内の地点Ｃに移動すると、移動局３は地点Ｂ付近で通信チャネルＴｃｈ２を基地局４－１の通信チャネルＴｃｈ１に切り替えて基地局２（基地局２－１ないし２－５のいずれかを表わす）との通信を維持する。

【００１３】上述した移動通信システムの無線ゾーン間チャネル切替についてさらに詳しく説明する。

【００１４】移動局３と通信中の基地局２－２は、隣接する無線ゾーン４－１，４－３，４－４および４－５で使用している通信チャネルの情報，つまり隣接する基地局４－１，４－３，４－４および４－５で使用している通信チャネルの情報である隣接ゾーン通信チャネル情報を通信中の通信チャネルＴｃｈ２を用いて移動局３に報知している。

【００１５】移動局３は基地局２－２から受けた隣接ゾーン通信チャネル情報を通信の開始直後から通信チャネル情報記憶部に記憶する。移動局３は、また、基地局２－２が送信する通信チャネルＴｃｈ２の品質，例えば受信レベルを通信品質検出部で絶えず検出している。移動局３が地点Ｂに移動し、上記通信品質検出部が通信チャネルＴｃｈ２の品質劣化を検出すると、移動局３の内蔵する受信レベル測定部が、既に記憶している隣接無線ゾーンの基地局２－１，２－３，２－４および２－５で使用している全ての通信チャネルＴｃｈ１，Ｔｃｈ３，Ｔｃｈ４およびＴｃｈ５の下り受信レベルを測定する。移動局３は地点Ｂでは基地局４－１で使用している通信チャネルＴｃｈ１の受信レベルを最も高く測定するので、移動局３は通信チャネル切替部によって通信チャネルＴｃｈ２を基地局４－１の通信チャネルＴｃｈ１に切り替える。この後、移動局３は無線ゾーン４－１内の地点Ｃに移動するが、切替後の通信チャネルＴｃｈ１を維持して基地局２－１との間の通信を継続する。

【００１６】図２は本実施例の基地局２から移動局３へ送る通信チャネルＴｃｈの信号構成図であり、（ａ）および（ｂ）の２信号構成例を示している。また、図３は通信チャネルＴｃｈに含まれる隣接ゾーン通信チャネル情報の信号構成図である。ここに示した通信チャネルＴｃｈはＴＤＭ方式の１スロットである。なお、通信用チャネルＴｃｈは、複数の無線チャネル（周波数チャネル）のいずれかと複数のＴＤＭスロットのいずれかとの組み合せで識別される必要がある。

【００１７】図２（ａ）を参照すると、この通信チャネルＴｃｈは、この通信チャネルのオーバーヘッドを伝送する無線制御チャネル（ＲＣＣＨ）と、隣接ゾーン通信チャネル情報を伝送する通信チャネル情報チャネル（ＣＣＴＣＨ）と、通信情報を伝送する情報チャネル（ＴＣＨ）と、上記情報チャネルに付随した制御用情報を伝送する低速付随制御チャネル（ＳＡＣＣＨ）とを含むＴＤＭチャネルである。この通信チャネルＴｃｈを用いると、基地局２は通信チャネルＴｃｈの送信ごとに隣接ゾーン通信チャネル情報を送信できる。なお、情報チャネルでは音声信号，データ信号，通話制御信号等を伝送し、低速付随制御チャネルは情報チャネルの種別を示す信号を伝送する。

【００１８】図２（ｂ）を参照すると、この通信チャネルＴｃｈは、この通信チャネルのオーバーヘッドを伝送する無線制御チャネル（ＲＣＣＨ）と、通信情報を伝送する情報チャネル（ＴＣＨ）と、上記情報チャネルに付随して制御用情報を伝送する低速付随制御チャネル（Ｓ

ＡＣＣＨ）とを含むＴＤＭチャネルである。情報チャネル（ＴＣＨ）では音声信号，データ信号，通話制御信号および隣接ゾーン通信チャネル情報等を伝送し、低速付随制御チャネルは情報チャネルの種別を示す信号を伝送する。この通信チャネルＴｃｈを用いる場合には、基地局２は隣接ゾーン通信チャネル情報を情報チャネルＴＣＨに間欠的に乗せて伝送することができる。

【００１９】図３を参照すると、図２（ａ）の通信チャネル情報チャネル（ＣＣＴＣＨ）または図２（ｂ）の情報チャネル（ＴＣＨ）に乗せて伝送される隣接ゾーン通信チャネル情報は、該当する基地局２の無線ゾーンに隣接する無線ゾーン（隣接無線ゾーン）の数ｎと、隣接無線ゾーンの符号と、隣接無線ゾーンの各各に対応する通信チャネル情報とからなる。通信チャネル情報は無線チャネル番号と同じ意味を持つ周波数番号とＴＤＭチャネルのスロット番号とからなる。なお、基地局２の使用できる通信チャネルＴｃｈは周波数番号とスロット番号の組み合せによる一般に複数チャネルである。

【００２０】図１および図３を併せ参照すると、移動局３が地点Ａにいるときには、移動局３は基地局２－２から下り通信チャネルＴｃｈ２を受けている。基地局２－２の隣接無線ゾーンは無線ゾーン２－１，２－３，２－４および２－５である。従って、基地局２－２は、隣接無線ゾーン数４，基地局２－１，２－３，２－４および２－５の符号，およびこれら基地局で使用している通信チャネルＴｃｈ，例えばＴｃｈ１，Ｔｃｈ３，Ｔｃｈ４およびＴｃｈ５にそれぞれ対応する周波数番号およびスロット番号からなる隣接ゾーン通信チャネル情報を通信チャネルＴｃｈ２に乗せて送信する。

【００２１】図４は本実施例に用いた基地局２のブロック図である。

【００２２】基地局２は、制御装置２１と、自局のＩＤ，隣接無線ゾーンの符号，隣接無線ゾーンで使用中の通信チャネルＴｃｈの情報（隣接ゾーン通信チャネル情報，つまり周波数番号およびスロット番号），等を記憶しておくメモリ２２と、スロットごとに周波数を変えることが可能なホッピングシンセサイザ２３と、送信機２４と、受信機２５と、アンテナ共用器２６と、アンテナ２７とを備えている。なお、隣接ゾーン通信チャネル情報は制御局１を介して隣接無線ゾーンから集められる。また、メモリ２２には通信チャネルＴｃｈとして自局で使用中の周波数番号およびスロット番号も記憶されている。制御装置２１は次のＴＤＭスロットが通信チャネルであれば、メモリ２２の情報から、ホッピングシセサイザ２３に周波数番号を指定し、送信機２４に対して自局のＩＤおよび隣接ゾーン通信チャネル情報を含んだ通信チャネルＴｃｈを送出するように指示する。

【００２３】図５は本実施例に用いた移動局３のブロック図である。

【００２４】移動局３は、制御装置３１と、基地局２から受けた隣接ゾーン通信チャネル情報を通信の開始直後から記憶するメモリ３２と、制御装置３１の指示により受信する通信チャネルＴｃｈごとに周波数を変えるシンセサイザ３３と、送信機３４と、受信機３５と、アンテナ共用器３６と、アンテナ３７と、基地局２から受ける通信チャネルＴｃｈの受信レベル，信号誤り率等の受信品質および隣接無線ゾーンで使用中の通信チャネルの受信レベルを測定する品質測定装置３８とを備える。

【００２５】図６は本実施例の移動局３の動作を示すフローチャートである。

【００２６】図１，図５および図６を併せ参照すると、移動局３は無線ゾーン４－１内の地点Ａにおいて基地局２－２と通信チャネルＴｃｈ２を使用して通信を開始する。移動局３は下り通信チャネルＴｃｈをアンテナ３７，アンテナ共用器３６および受信機３５を介して制御装置３１に受ける。メモリ３２は、通信開始直後から、下り通信チャネルＴｃｈ２によって伝送されている隣接ゾーン通信チャネル情報を制御装置３１から受けて記憶している（ステップ１）。移動局３が無線ゾーン４－２内にいるときに通信が終了すると（ステップ２のｙ）、制御装置３１は基地局２－２との通信を終了させる（ステップ３）。

【００２７】通信の継続中（ステップ２のｎ）には、品質測定装置３８が下り通信チャネルＴｃｈ２の受信レベルを絶えず測定している（ステップ４）。この受信レベルが所定レベル以上であれば（ステップ５のｎ）、移動局３はステップ２からの動作を繰り返し、制御装置３１は基地局２－２と通信チャネルＴｃｈを用いた通信を継続させる。ここで、移動局３が無線ゾーン４－１寄りの無線ゾーン４－２の端にある地点Ｂに移動すると、品質測定装置３８が下り通信チャネルＴｃｈ２の受信レベル劣化を検出して制御装置３１に知らせる（ステップ５のｙ）。

【００２８】通信中の通信チャネルＴｃｈ２の受信レベル劣化の検出報告を受けると、制御装置３１はメモリ３２に記憶している隣接無線ゾーンの基地局２－１，２－３，２－４および２－５で使用している全ての通信チャネルＴｃｈ１，Ｔｃｈ３，Ｔｃｈ４およびＴｃｈ５の下り受信レベルを品質測定装置３８に測定させる（ステップ６およびステップ７のｎ）。全隣接無線ゾーンの基地局からの下り通信チャネルの受信レベル測定が終了すると（ステップ７のｙ）、制御装置３１はシンセサイザ３３の周波数を制御して受信機３５の通信チャネルＴｃｈを自無線ゾーンの基地局２－２および隣接無線ゾーンの基地局からの下り通信チャネルＴｃｈ１～Ｔｃｈ５のうちの最も受信レベルの高い通信チャネルに設定する。地点Ｂでは品質測定装置３８が基地局４－１で使用している通信チャネルＴｃｈ１の受信レベルを最も高く測定するので、制御装置３１は受信機３５の受信していた通信チャネルＴｃｈ２を基地局４－１の通信チャネルＴｃｈ

１に切り替える（ステップ８）。この後、移動局３は、ステップ２の動作に戻り、基地局２－１との間の通信を切替後の通信チャネルＴｃｈ１を維持して継続する。この状態は移動局３が無線ゾーン４－１内の地点Ｃに移動しても続く。

【００２９】以上、実施例を用いて説明した本発明による移動通信システムの無線ゾーン間チャネル切替方式は、公共業務用デジタル移動通信システムやＭＣＡシステムに代表されるグループ通信用の移動通信システムに特に有効である。グループ通信ではサービスエリア内の移動局を複数の群にグルーピングし、移動局は群内の移動局Ｎ局と１対Ｎ通信を行う。このようなグループ通信の場合には、基地局２の各各は、移動局の各群ごとに通信チャネルＴｃｈを予め定め、この通信チャネルＴｃｈを用いて間断なく通信できるようにすることが多い。このように各移動局群の使用する通信チャネルを予め定めておくと、移動局３における通信チャネル選局の負担が軽くなる。

【００３０】なお、本発明による移動通信システムの無線ゾーン間チャネル切替方式は、従来からあるＭＣＡシステムのように、移動局３が通信できる無線ゾーン４の範囲を限定してよいことは勿論である。この場合には、基地局２または移動局３に通信できる相手局を限定する機能を設けておく。

【００３１】

【発明の効果】以上説明したように本発明は、複数の基地局の各各が、隣接する無線ゾーンで使用している前記通信チャネルの情報である隣接ゾーン通信チャネル情報を報知する通信チャネル情報報知手段を備え、複数の移動局の各各が、前記基地局から受けた前記隣接ゾーン通信チャネルの情報を前記通信の開始直後から記憶する通信チャネル情報記憶手段と、通信中の前記基地局からの前記通信チャネルの品質を検出する通信品質検出手段と、前記通信チャネルの品質劣化が検出されると前記隣接ゾーン通信チャネルの下り受信レベルを測定する受信レベル測定手段と、前記通信チャネルを最も高い受信レベルが測定された自無線ゾーンまたは前記隣接無線ゾーンの通信チャネルに設定する通信チャネル切替手段とを備えるので、チャネル切替用の制御信号の送受信を一切必要とせずに前記移動局が単独で通信チャネルの切り替えを実行でき、チャネル切替時において無線および有線制御回線のトラヒックを軽減できるとともに基地局での信号処理の負荷軽減ができるという効果がある。

【図面の簡単な説明】

【図１】本発明の一実施例のシステム構成図である。

【図２】本実施例の基地局２から移動局３へ送る通信チャネルＴｃｈの信号構成図であり、（ａ）は第１の例，（ｂ）は第２の例を示している。

【図３】通信チャネルＴｃｈに含まれる隣接ゾーン通信チャネル情報の信号構成図である。

【図４】本実施例に用いた基地局２のブロック図である。

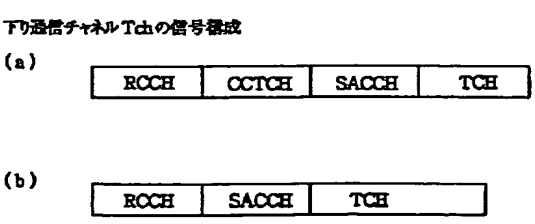
【図５】本実施例に用いた移動局３のブロック図である。

【図６】本実施例の移動局３の動作を示すフローチャートである。

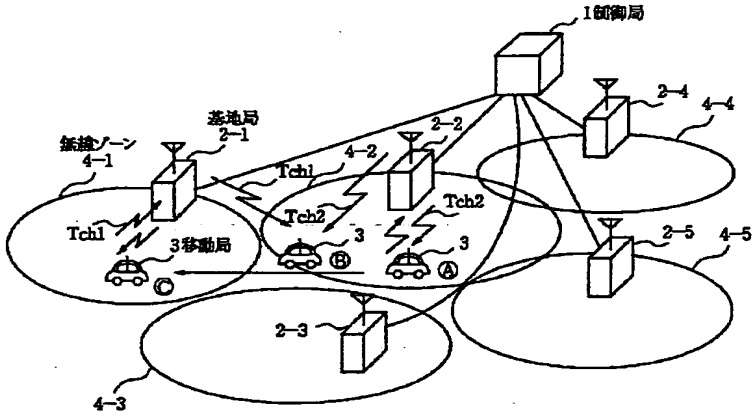
【符号の説明】

１　制御局
２－１～２－５　基地局
３　移動局
４－１～４－５　無線ゾーン
２１　制御装置
２２　メモリ
２３　ホッピングシンセサイザ
２４　送信機
２５　受信機
２６　アンテナ共用器
２７　アンテナ
３１　制御装置
３２　メモリ
３３　シンセサイザ
３４　送信機
３５　受信機
３６　アンテナ共用器
３７　アンテナ
３８　品質測定装置

【図２】



【図１】

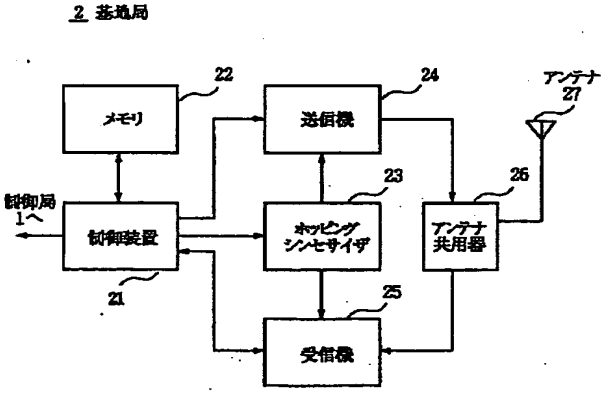


【図３】

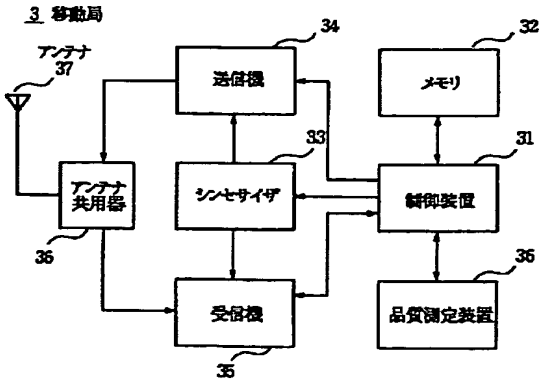
隣接ゾーン通信チャネル情報

隣接無線ゾーン数		
隣接無線ゾーンa	周波数番号	スロット番号
隣接無線ゾーンb	周波数番号	スロット番号
隣接無線ゾーンc	周波数番号	スロット番号
・ ・ ・	・ ・ ・	・ ・ ・
隣接無線ゾーンn	周波数番号	スロット番号

【図４】



【図５】



【図６】